March 16, 1965

Dr. William J. Wiswesser
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Dear Dr. Wiswesser:

Thank you for clearing up the 43 tetracyclics. (Your letter said tricyclics; hence the confusion.)

I have only looked explicitly at graphs with a valence _ 4. The algorithm is to scan all the trivalent graphs, then systematically replace one or more tetragonal circuits by quadrivalent centers. Thus the graphs 6-13 of your diagram ('63-8) can be obtained from the set of 8-vertex trivalent graphs as follows:

6	8L (1)	10	8D	
7	8I	11	8C	
8	8L (2) or 8G	12	8B	
9	8K	13	8E	(coded per p. 136 attached)

while with the reduction of 2 tetragonal circuits, 14-22 correspond to the 10-vertex graphs

14	AGECA	17	AGCDB	20 ACECC
15	ACACA	18	AGBCB	21 BDECC
16	AGECA	19	BCCCB	22 BCDDB

coded as in the sheets already sent you. Your list seems to be complete as far as these go. I would need a computer program to search the list of 12-graphs for each qualifying example to check against tribe X_3 (graphs with 3 disjoint tetragons) but have no doubt your list is correct on these also. One could use the same principle (reduction of pentagonal circuits) to find all possible V-types, etc.

As to the theory of partitions, my experience has been that the analytical derivations all give recursive expressions which, however elegant, amount to precisely the same computations as, e.g., Blair and Henze used. It will take me some time to digest your notes, but I note you may not have run into a little known work by R. A. Fisher, which I enclose. (Fisher seems to have overlooked or bypassed both Polya and Henze-Blair.) Your notes included several references that were new to me and which I am very happy to have.

Dr. William J. Wiswesser

My main interest in this field is the systematic generation of hypotheses,
i.e., explicit constructions of distinct types. Combinatorial analysis of course
plays a guiding role in this, but it looks as if still more powerful methods need
to be developed and applied. Perhaps Polya may be able to help in these steps.

Sincerely yours,

Joshua Lederberg
Professor of Genetics

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P.S. I talked to Dr. Smith over the phone. I can see no simple formulation
of the conjecture underlying old Rule 30 in its new formulationn.